

**Three dimensional MHD study of solar corona
based on the magnetograph observations**

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Magnetohydrodynamic (MHD) properties of active regions in solar corona is investigated by combining the numerical analysis technique and the vector magnetograph observations. First, we numerically construct the potential magnetic field of several major active regions, and compare them with the tangential component of the magnetic field observed by Solar Flare Telescope in National Astronomical Observatory of Japan. The results suggest us that the amount of gap between the observed field and the potential field is some measure relating to the magnitude of solar flares taking place there. Secondly, we develop the numerical model to construct the three dimensional (3D) nonlinear equilibria in active regions using the vector magnetic field observed by magnetograph. Furthermore, the MHD stability of the solar corona will be discussed based on the numerical calculations using the 3D equilibria as the initial condition.